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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/010,237	12/07/2001	Bidyut K. Sen	03226/092001	5837

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EXAMINER

LEWIS, MONICA

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 03/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/010,237

Applicant(s)

SEN, BIDYUT K.

Examiner

Monica Lewis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is in response to the request for continued examination filed October 17, 2003.

Response to Arguments

2. Applicant's arguments with respect to claims 1-17 have been considered but are moot in view of the new ground(s) of rejection.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/17/03 has been entered.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention: a) "a surface area of an uncovered peripheral portion of the top surface of the package substrate is no greater than 21% of a total surface area of the top surface of the package

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substrate, the uncovered peripheral portion defined as a surface area of the top surface of the package substrate between an outside perimeter of the unitary capacitor and a perimeter of the package substrate” (See Claims 1 and 8). Claims 2-7 and 9-17 depend directly or indirectly from a rejected claim and are, therefore, also rejected under 35 U.S.C. 112, first paragraph for the reasons set above.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 8 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Schaper (UK Patent No. 2098001A).

In regards to claim 8, Schaper discloses the following:

a) a semiconductor die (14) mounted on a top portion of a top surface of a package substrate (For Example: See Figure 1);

b) a unitary capacitor (20) having an aperture formed therein, and mounted on the top surface of the package substrate surrounding the semiconductor die (For Example: See Figure 1); and

c) the unitary capacitor is configured such that when the unitary capacitor is disposed on a top surface of a package substrate, a surface area of an uncovered peripheral portion of the top surface of the package substrate is no greater than 21% of a total surface area of the top surface of the package substrate, the uncovered peripheral portion defined as a surface area of the top surface of the package substrate between an outside perimeter of the unitary capacitor and a perimeter of the package substrate (For Example: See Figure 1). Note in Figure 1 that the capacitor covers the entire peripheral portion of the substrate, leaving none of the peripheral portion uncovered. Hence, the uncovered peripheral portion of the top surface of the substrate is not greater than 21% of the total surface area of the top surface.

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In regards to claim 11, Schaper discloses the following:

- a) the aperture is rectangular (For Example: See Figure 1).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 2, 3, 5 and 7 are rejected under 35 U.S.C. 103(a) as obvious over Schaper (UK Patent No. 2098001A) in view of Applicant's Prior Art Figures.

In regards to claim 1, Schaper discloses the following:

a) an unitary capacitor (20) having a bottom surface and a top surface, and an aperture is formed in a central portion thereof extending from the top surface to the bottom surface (For Example: See Abstract and Figure 1).

b) the unitary capacitor is configured such that when the unitary capacitor is disposed on a top surface of a package substrate (16), a surface area of an uncovered peripheral portion of the top surface of the package substrate is no greater than 21% of a total surface area of the top surface of the package substrate, the uncovered peripheral portion defined as a surface area of the top surface of the package substrate between an outside perimeter of the unitary capacitor and a perimeter of the package substrate (For Example: See Figure 1).

In regards to claim 1, Schaper fails to disclose the following:

a) the bottom surface is provided with electrical connections adapted to be connected to a substrate.

However, Applicant's Prior Art discloses a bottom surface that is provided with electrical connections (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Schaper

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to include a bottom surface that is provided with electrical connections as disclosed in Applicant's Prior Art because it aids in connecting the device with the substrate (For Example: See Paragraph 2).

Additionally, since Schaper and Applicant's Prior Art Figures are both from the same field of endeavor, the purpose disclosed by Applicant's Prior Art Figures would have been recognized in the pertinent art of Schaper.

In regards to claim 2, Schaper discloses the following:

- a) aperture is rectangular (For Example: See Figure 1).

In regards to claim 3, Schaper discloses the following:

- a) a unitary capacitor that comprises a layer of an electrically conductive material and a layer of a dielectric material (For Example: See Page 3 Lines 23-25).

In regards to claim 5, Schaper fails to disclose the following:

- a) electrical connections provided on the bottom surface comprise a ball grid array.

However, Applicant's Prior Art discloses a bottom surface that is provided with electrical connections (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Schaper to include a bottom surface that is provided with electrical connections as disclosed in Applicant's Prior Art because it aids in connecting the device with the substrate (For Example: See Paragraph 2).

Additionally, since Schaper and Applicant's Prior Art Figures are both from the same field of endeavor, the purpose disclosed by Applicant's Prior Art Figures would have been recognized in the pertinent art of Schaper.

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In regards to claim 7, Schaper discloses the following:

a) the aperture is configured to fit over a semiconductor die (For Example: See Figure 1).

In regards to claim 7, Schaper discloses the following:

a) electrical connections are configured for connection to a package substrate on which the semiconductor die is mounted.

However, Applicant's Prior Art discloses a bottom surface that is provided with electrical connections (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Schaper to include a bottom surface that is provided with electrical connections as disclosed in Applicant's Prior Art because it aids in connecting the device with the substrate (For Example: See Paragraph 2).

Additionally, since Schaper and Applicant's Prior Art Figures are both from the same field of endeavor, the purpose disclosed by Applicant's Prior Art Figures would have been recognized in the pertinent art of Schaper.

10. Claim 4 is rejected under 35 U.S.C. 103(a) as obvious over Schaper (UK Patent No. 2098001A) in view of Applicant's Prior Art Figures and Barnett et al. (U.S. Publication No. 2002/0011354).

In regards to claim 4, Schaper fails to disclose the following:

a) the housing of the unitary capacitor is made from a plastic material.

However, Barnett et al. ("Barnett") discloses housing made from plastic (For Example: See Paragraph 0010). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Schaper to include housing

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made from plastic as disclosed in Barnett because it aids in protecting the device from being damaged (For Example: See Figures 4-7).

Additionally, since Schaper and Barnett are both from the same field of endeavor, the purpose disclosed by Barnett would have been recognized in the pertinent art of Schaper.

11. Claim 6 is rejected under 35 U.S.C. 103(a) as obvious over Schaper (UK Patent No. 2098001A) in view of Applicant's Prior Art Figures and Pape (U.S. Patent No. 6,215,171).

In regards to claim 6, Schaper fails to disclose the following:

a) the unitary capacitor capacitive material comprises co-fired ceramic.

However, Pape discloses capacitive material made from co-fired ceramic (For Example: See Column 8 Lines 10-12). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Schaper to include capacitive material made from co-fired ceramic as disclosed in Pape because it aids in determining the capacitance of capacitors (For Example: See Column 3 Lines 39-47 and Column 4 Lines 10-26 and Column 4 Lines 64-67).

Additionally, since Schaper and Pape are both from the same field of endeavor, the purpose disclosed by Pape would have been recognized in the pertinent art of Schaper.

12. Claims 9 and 17 are rejected under 35 U.S.C. 103(a) as obvious over Schaper (UK Patent No. 2098001A) in view of Komiya et al. (U.S. Publication No. 2002/0011662).

In regards to claim 9, Schaper fails to disclose the following:

a) electronic component mounted on a top surface of the capacitor.

However, Komiya et al. ("Komiya") discloses the use of an electronic component mounted on a top surface of a capacitor (For Example: See Figure 5). It would have been

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obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Schaper to include the use of an electronic component mounted on a top surface of a capacitor as disclosed in Komiya because it aids in reducing the inductance (For Example: See Paragraph 5).

Additionally, since Schaper and Komiya are both from the same field of endeavor, the purpose disclosed by Komiya would have been recognized in the pertinent art of Schaper.

In regards to claim 17, Schaper fails to disclose the following:

a) the capacitor is mounted on the package substrate via a ball grid array.

However, Komiya discloses the use of a ball grid array (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Schaper to include a ball grid array as disclosed in Komiya because it aids in providing low impedance connections (For Example: See Paragraph 24).

Additionally, since Schaper and Komiya are both from the same field of endeavor, the purpose disclosed by Komiya would have been recognized in the pertinent art of Schaper.

13. Claim 10 is rejected under 35 U.S.C. 103(a) as obvious over Schaper (UK Patent No. 2098001A) in view of Tigelaar et al. (U.S. Patent No. 4,827,323).

In regards to claim 10, Schaper fails to disclose the following:

a) a second capacitor mounted on the first capacitor.

However, Tigelaar et al. ("Tigelaar") discloses capacitors stacked on each other (For Example: See Column 1 Lines 31-57). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Schaper to

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include capacitors stacked on each other as disclosed in Tigelaar because they aid in increasing capacitance (For Example: See Column 1 Lines 31-57).

Additionally, since Schaper and Tigelaar are both from the same field of endeavor, the purpose disclosed by Tigelaar would have been recognized in the pertinent art of Schaper.

14. Claims 12, 13 and 14 are rejected under 35 U.S.C. 103(a) as obvious over Schaper (UK Patent No. 2098001A) in view of Mamodaly et al. (U.S. Patent No. 4,839,712).

In regards to claim 12, Schaper fails to disclose the following:

a) the capacitor comprises a housing.

However, Mamodaly et al. ("Mamodaly") discloses a capacitor that has housing (For Example: See Figure 6). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Schaper to include a capacitor that has housing as disclosed in Mamodaly because it aids in supplying the bias (For Example: See Abstract).

Additionally, since Schaper and Mamodaly are both from the same field of endeavor, the purpose disclosed by Mamodaly would have been recognized in the pertinent art of Schaper.

In regards to claim 13, Schaper discloses the following:

a) capacitor comprises a capacitive material (For Example: See Page 3 Lines 23-25).

In regards to claim 13, Schaper fails to disclose the following:

a) housing.

However, Mamodaly discloses a capacitor that has housing (For Example: See Figure 6). It would have been obvious to one having ordinary skill in the art at the time the invention was

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made to modify the semiconductor device of Schaper to include a capacitor that has housing as disclosed in Mamodaly because it aids in supplying the bias (For Example: See Abstract).

Additionally, since Schaper and Mamodaly are both from the same field of endeavor, the purpose disclosed by Mamodaly would have been recognized in the pertinent art of Schaper.

In regards to claim 14, Schaper discloses the following:

a) the capacitive material comprises a layer of an electrically conductive material and a layer of a dielectric material (For Example: See Page 3 Lines 23-25).

15. Claim 15 is rejected under 35 U.S.C. 103(a) as obvious over Schaper (UK Patent No. 2098001A) in view of Mamodaly et al. (U.S. Patent No. 4,839,712) and Barnett et al. (U.S. Publication No. 2002/0011354).

In regards to claim 15, Schaper fails to disclose the following:

a) the housing is made from a plastic material.

However, Barnett discloses housing made from plastic (For Example: See Paragraph 0010). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Schaper to include housing made from plastic as disclosed in Barnett because it aids in protecting the device from being damaged (For Example: See Figures 4-7).

Additionally, since Schaper and Barnett are both from the same field of endeavor, the purpose disclosed by Barnett would have been recognized in the pertinent art of Schaper.

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16. Claim 16 is rejected under 35 U.S.C. 103(a) as obvious over Schaper (UK Patent No. 2098001A) in view of Mamodaly et al. (U.S. Patent No. 4,839,712) and Pape (U.S. Patent No. 6,215,171).

In regards to claim 16, Schaper fails to disclose the following:

a) the housing comprised co-fired ceramic.

However, Barnett discloses housing made from co-fired ceramic (For Example: See Paragraph 0024). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Schaper to include capacitive and housing material made from co-fired ceramic as disclosed in Barnett because it aids in providing high density and low cost devices (For Example: See Paragraphs 1-3).

Additionally, since Schaper and Barnett are both from the same field of endeavor, the purpose disclosed by Barnett would have been recognized in the pertinent art of Schaper.

b) the capacitive material comprised of co-fired ceramic.

However, Pape discloses capacitive material made from co-fired ceramic (For Example: See Column 8 Lines 10-12). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Schaper to include capacitive material made from co-fired ceramic as disclosed in Pape because it aids in determining the capacitances of capacitors (For Example: See Column 3 Lines 39-47 and Column 4 Lines 10-26 and Column 4 Lines 64-67).

Additionally, since Schaper and Pape are both from the same field of endeavor, the purpose disclosed by Barnett would have been recognized in the pertinent art of Schaper.

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Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 571-272-1838.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML
March 2, 2004



**Mary Wilczewski
Primary Examiner**